Nevada Test Site

Stockpile Stewardship Program March 2001

Introduction

The program rests on developing an unprecedented set of scientific tools to better understand nuclear weapons, on significantly enhancing our surveillance capabilities, and on completing a new manufacturing program needed to extend the life of our nuclear weapons. The program has also allowed the Secretaries of Defense and Energy to certify that the nuclear stockpile remains safe and reliable and that nuclear testing is not needed at this time.

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Establishment of Program

The Stockpile Stewardship Program (SSP) was established in response to the Fiscal Year 1994 National Defense Authorization Act (P.L. 103-160) which called on the Secretary of Energy to "establish a stewardship program to ensure the preservation of the core intellectual and technical competencies of the United States in weapons."
In the absence of nuclear testing, the Stockpile Stewardship Program must: 1. Support a focused, multifaceted program to increase the understanding of the enduring stockpile; 2. Predict, detect, and evaluate potential problems due to the aging of the stockpile; 3. Refurbish and re-manufacture weapons and components, as required; and 4. Maintain the science and engineering institutions needed to support the nation's nuclear deterrent, now and in the future.

As the civilian steward of the nation's nuclear weapons complex, the U.S. Department of Energy (DOE) is responsible for the safety and reliability of the nation's nuclear arsenal to the nation. The Department of Defense (DoD) partners with the DOE in setting requirements and establishing production goals. A key challenge to the Stockpile Stewardship Program is to balance military weapon performance goals against civilian and military surety and safety concerns.

Campaigns

Campaigns are technically challenging, multi-year, multi-functional efforts conducted at the Defense Programs laboratories, production plants, and at the Nevada Test Site. The goal is to provide the capabilities needed to address current and future stockpile issues by employing world class scientists and engineers, and by providing the most advanced scientific and engineering infrastructure.

Maintaining Test Readiness

Activities are conducted at the Nevada Test Site to preserve skills and facilities required to resume testing within 24 to 36 months, if so directed by the President. Key and critical positions are identified for the functional areas necessary to safely execute an underground test. Overall readiness is supported by experimental programs conducted at the test site. In particular, test readiness at the Nevada Test Site is critically dependent on the Campaigns and laboratory-based experiments that exercise high-bandwidth recording and advanced diagnostic development that are not required for subcritical experiments.

Assessment and Certification

In the absence of nuclear testing, different experiments and tools must be relied upon to obtain data relevant to nuclear warhead performance. A suite of enhanced capabilities and facilities have been developed that are being used to fill in the knowledge gaps and to provide data relevant to the various stockpile concerns that have been identified. This approach has enabled the U.S. Department of Energy to successfully address stockpile issues that have emerged to date. However, as the stockpile ages, it is anticipated that more difficult assessment issues will arise. In addition, it is possible that, as in past cases, design and production flaws will be discovered in systems that have been in the stockpile for some time.

Program Thrusts

The U.S. Department of Energy's weapon laboratories are engaged in a balanced and integrated program of computational simulation, fundamental scientific research and experiments. Non-nuclear experiments, e.g., subcritical experiments, are being used to assess weapon component performance. Together with past nuclear test results, they are also being used to validate computer simulations, which rely heavily on fundamental scientific research as a source of data and a basis for the detailed physics models in the codes. Once validated, weapons physics simulations will guide the judgements made about integral stockpile issues.

Experimental Facilities

Among the many experimental facilities being used by the weapon laboratories is the U1a Facility at the Nevada Test Site, where subcritical experiments have been conducted since July 2,1997. Test data from these experiments will help maintain the reliability of the nuclear weapons stockpile by allowing scientists to gain more knowledge of the dynamic properties of aging nuclear materials. Of particular interest is the behavior of plutonium and data that can be used in computer calculations of nuclear weapon performance and safety in the absence of underground nuclear testing.

Stockpile Stewardship is Working

A comprehensive internal review of the stockpile stewardship program that was published in November 23, 1999, stated that the program which began in 1993 was sound and developing the science, technology, and production capabilities needed to maintain the long-term safety, security and reliability of the nation's existing nuclear weapons without underground nuclear testing.

Examples of specific accomplishments cited in the report include, having:

Ž completed three annual certifications of the stockpile, which resulted in no requirement for underground testing;

Ž delivered refurbished W-87 Peacekeeper warheads to the Department of Defense;

Ž developed, certified, produced, and fielded the B61-11, replacing the less safe B53 bomb;

Ž started production of new, replacement neutron generators, a component of all nuclear weapons;

Ž reestablished pit production capability at Los Alamos National Laboratory;

Ž started exhaustive life extension studies for the W76 Trident missile warhead and W80 strategic cruise missile warhead;

Ž assured a new source of tritium, a radioactive gas in nuclear weapons that must be replaced periodically; and

Ž performed subcritical experiments that have provided key data on aging plutonium.

ŽMade the first W88 development pit at Los Alamos National Laboratory.

In a December 10, 1999 statement, former Secretary of Energy Bill Richardson, said "The stockpile stewardship program is a cornerstone of our national security, and this review confirms that it is successfully keeping our nuclear deterrent strong, and the American people safe. Every year we have seen important advances in the science and capabilities needed to maintain these weapons without nuclear testing, and we believe these programs will continue."

"The U.S. nuclear deterrent remains a supreme national interest of the United States," former Secretary Richardson said. "We at the Department of Energy will continue our work to fulfill this important national security mission."

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